Space Weather Forecast

Issued on Thursday, 04 May 2023 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 blackouts expected throughout with a chance of R3 Strong radio blackouts. Very slight chance of minor geomagnetic storm conditions on 05 or 06 May.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate through the last 24 hours, with three Moderate-class flares observed. The sources of these are two magnetically complex regions in the northeast quadrant, which have developed rapidly through the period. These two regions are accompanied by a third region to the southeast, which may also be extremely complex, although satellite imagery is currently difficult to analyse. Another complex region on the southwest horizon is starting to rotate from view but could still present a flare risk from beyond the limb. In total there are nine sunspot regions on the visible disc, with the remaining five regions all currently relatively simple. A CME leaving the north of coronagraph imagery has been assessed as heading away from the Earth, with no Earth-directed CMEs observed on any available imagery.

Solar Wind / Geomagnetic Activity: Solar winds have slowly decreased from elevated to slightly elevated levels through the last 24 hours. Total magnetic field strength was weak, with the north-south component also weak. This has however been persistently negative through much of the period. Geomagnetic activity was Quiet throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Moderate to High activity is expected, mainly from the numerous complex regions in the northeast.

Solar Wind / Geomagnetic Activity: No CMEs are expected at Earth within the forecast period. The current fast solar wind is expected to decline, with a connection to further sources of the fast solar wind on 05 May and then 06 May. These two subsequent fast solar winds may combine and become indistinguishable. Speeds are uncertain, but could be in the range of 400-500km/s. Geomagnetic activity is expected to be mainly Quiet, with a slight chance of Active or G1/Minor Storm intervals on 05 and 06 May.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to persist at background levels with no solar radiation storms occurring. However count rates may increase with any notable flares that occur, with a slight chance of reaching the S1 Minor Radiation Storm threshold throughout, mainly from the complex region in the northeast quadrant.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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